

Point Reyes National Seashore Rare Plant Inventory Report

2004



Public Version

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1.0 Introduction

Point Reyes National Seashore (PORE) is host to over 900 species of flowering plants, representing approximately 16% of the plant species known to occur in California. Not surprisingly, this diverse flora includes a significant number of rare plant species. At present, 49 plant species within Point Reyes are considered rare. As of 2004, five plant species appear on the federally endangered list, one is listed as State Endangered, 33 are federal species of concern, and the California Native Plant Society (CNPS) lists an additional 10 species as rare.

Successful management of rare plant species requires comprehensive information describing their abundance and distribution. Prior to 2001, this information was unknown or incomplete for many rare species within Point Reyes. Recognizing the need for a comprehensive rare plant survey, resource staff initiated the search for undocumented rare plant populations within the Seashore in 2001. The National Park Service Inventory and Monitoring Program and grants from the National Fish and Wildlife Foundation and the Point Reyes National Seashore Association provided financial support for this effort.

The following document provides details describing the 2001-2004 PORE rare plant inventory effort and is intended to assist in future rare plant management and monitoring activities. Included is a brief summary of past survey work, a description of field methods, a summary of inventory results, survey maps, and field data.

1.1 Background

Rare plant field surveys in PORE have been conducted intermittently since the early 1980's. David Self, a seasonal park service employee, conducted the first documented systematic rare plant survey in July-September 1982. During his survey, Self visited 42 of the 63 documented rare plant sites, but reported no new occurrences (Self, unpublished report). A second systematic rare plant survey was conducted between April 1983 and July 1984 by park biologists Ronilee Clark and Gary Fellers. Clark and Fellers visited a total of 143 rare plant populations and documented 49 new populations of rare plant species (Clark and Fellers 1987). Between 1986-2000, the majority of rare plant surveys were conducted by a small group of volunteers from the Marin chapter of the CNPS. Although most of their findings did not result from systematic searches, the CNPS rare plant surveys were highly successful with 146 new locations of rare plant species documented over 18 years.

In August of 2001, the sixth edition of the CNPS Inventory of Rare and Endangered Plants of California (California Native Plant Society 2001) was published and with it a number of new species were added to the Seashore's rare plant list. Around the same time, the park acquired a number of new land parcels that required detailed floristic surveys. These two factors, in combination with the fact that almost 20 years had passed since the last systematic rare plant survey, prompted managers to begin planning for a comprehensive PORE rare plant inventory in 2001.

1.2 Objectives

The following were objectives of the PORE rare plant inventory:

- To conduct rare plant inventories on PORE and north district Golden Gate National Recreation Area (GOGA) lands that had not previously been subject to such inventories.
- To collect site and population data on all rare plant occurrences identified during the inventories.
- To identify any threats to rare plant populations that required immediate management action.

2.0 Methods

Field surveys were conducted between March-September of 2001-2004 and were timed to coincide with the blooming period of target rare plant species. Inventory efforts focused on lands within the boundaries of PORE as well as in select areas within the north district of GOGA.

2.1 Preparation

Prior to conducting field surveys, an assessment of all rare plants known, or with potential, to occur within the Seashore was conducted. Plant occurrence records were carefully reviewed and a prioritized list of rare plant species was developed. Habitats with potential to support rare species were identified using the park vegetation map, aerial photographs, and the past experience of CNPS members, local botanists, and resource management staff.

Species were considered a high priority for inventory if they fell under one of the following categories:

- (1) Species with potential to occur within the Seashore. Potential species were identified using the input of local botanists, location descriptions on herbarium specimens, and species distribution data from published floras.
- (2) Species that were newly listed in the CNPS Sixth Inventory of Rare and Endangered Plants of California. Recently listed species would have been overlooked in previous survey efforts.
- (3) Federal or State listed species.
- (4) Species for which very little information was known.
- (5) Locally rare or “high risk” species. These were identified using the input of local botanists and resource management staff.

Similarly, areas within the Seashore were considered high survey priority if they were described by one of the following categories:

- (1) Areas within the Seashore that had not been visited by CNPS volunteers because of their remote locality or difficult access.
- (2) Newly acquired land parcels.

- (3) Areas where park projects or management activities (i.e. prescribed fire or park maintenance) were planned.

2.2 Survey Methods

Prior to going in the field, schedules were created with all rare plant species sorted by blooming period (month) and habitat type (Appendix 1). Field surveys were then conducted by “sweeping” through the survey area and by focusing searches in areas that contained suitable habitat for target rare plant species. For each survey, the following data were recorded: survey date, surveyor, location of survey polygon, description of the habitat(s) within the survey area, target rare species, and rare plant populations encountered (both new and known). When appropriate, those species with potential to occur within the survey area but were missed due to the timing of the survey, access difficulties, etc. were also recorded. Suggestions for future survey or restoration work, locations of invasive species occurrences, and other relevant information were included under additional comments. All inventory survey data were entered into the Point Reyes Rare Plant database. Appendix 2 provides an example of the Point Reyes Rare Plant Inventory Field Sheet.

At the end of each rare plant survey a polygon was hand drawn onto a topographic map to mark the area covered by the search. In some cases, to increase accuracy, UTM points were taken using a GPS unit to note the beginning and end points of a survey area. The hand drawn polygons were then digitized in ArcView using heads-up digitizing. In an effort to provide more detailed site information, some polygons were divided into sub-polygons to represent different vegetation community types encountered during the survey. It is important to note that the PORE inventory polygons provide an approximation of the area surveyed and should not be interpreted as providing precise spatial information. See Appendix 3 for details regarding the creation and interpretation of the Point Reyes Rare Plant Inventory spatial data.

All rare plant occurrences encountered during the field surveys were documented using the Point Reyes Rare Plant Field Survey Form (Appendix 4) and mapped using a GPS unit. The PORE field survey form was adapted from the California Natural Diversity Database (CNDDDB) Native Species Field Survey Form, which is a standard data sheet used by most agencies and non-profit organizations for monitoring rare plant populations in California. For each rare species encountered, the following information was recorded: location, habitat (plant community, species associations, elevation, slope, and aspect), an estimate or count of the number of plants, existing or potential threats, and management recommendations. Copies of individual occurrence datasheets are not included in this report but are on file in the Resource Management Division at Point Reyes National Seashore.

2.3 Rare-Plant-A-Thon Events

Faced with the task of surveying over 71,000 acres of potential habitat, resource managers created the “Rare-Plant-A-Thon” as a way to involve the public in the search for undocumented rare plant populations within Point Reyes. Since the idea was first conceived in 2001, park managers have hosted six Rare-Plant-A-Thon weekends. In total, 350 volunteers have participated in these events, logging in over 2,300 volunteer hours.

At the start of each Rare-Plant-A-Thon, volunteers received training that included a slide show of the Seashore’s rare plant species and a discussion of where participants might expect to encounter them.

Park staff and local botanists then led small groups of volunteers to different areas within the Seashore with instructions to survey for target rare plant species.

In addition to involving the public in the park's management activities, these events have made a large contribution to the Point Reyes inventory effort as a whole. As a result of the six Rare-Plant-A-Thons, 67 new occurrences have been located, documented and mapped (See Table 1), including one new addition to the Seashore's plant list, the rare Humboldt Bay owl's clover (*Castilleja ambigua* ssp. *humboldtiensis*).

Table 1. Results from the six Point Reyes National Seashore Rare-Plant-A-Thon events.

Rare-Plant-A-Thon (year)	Number of participants	Number of new occurrences documented
1 (2001)	38	8
2 (2001)	47	13
3 (2002)	57	13
4 (2002)	55	10
5 (2003)	72	15
6 (2004)	81	8
TOTAL	350	67

3.0 Summary of Results

As a result of the Point Reyes inventory effort, 148 previously unrecorded rare plant populations were documented and mapped (Table 2). These findings bring the total number of rare plant populations within the Seashore up to 438, an increase of 34%. In addition, three new rare species were added to the Seashore's plant list: the federally endangered robust spineflower (*Chorizanthe robusta* var. *robusta*), the CNPS listed Humboldt Bay owl's clover (*Castilleja ambigua* ssp. *humboldtiensis*), and coastal bluff morning glory (*Calystegia purpurata* ssp. *saxicola*). In total, 4,346 acres (1,760 ha) of potential habitat were surveyed during the inventory effort. The approximate number of acres surveyed for each habitat type is provided in Table 3.

Table 2. Rare plant occurrences documented in 2001-2004 PORE Rare Plant Inventory.

Species	Number of new occurrences
<i>Abronia umbellata</i> ssp. <i>breviflora</i>	5
<i>Agrostis blasdalei</i>	4
<i>Alopecurus aequalis</i> var. <i>sonomensis</i> *	1
<i>Arabis blepharophylla</i>	1
<i>Arctostaphylos virgata</i>	3
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>	10
<i>Calystegia purpurata</i> ssp. <i>saxicola</i>	7
<i>Castilleja ambigua</i> ssp. <i>humboldtiensis</i>	1
<i>Ceanothus gloriosus</i> var. <i>gloriosus</i>	2
<i>Chorizanthe robusta</i> *	3
<i>Cirsium andrewsii</i>	4

<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	10
<i>Elymus californicus</i>	13
<i>Fritillaria affinis</i> var. <i>tristulis</i>	11
<i>Fritillaria liliaceae</i>	1
<i>Gilia capitata</i> ssp. <i>chamissonis</i>	6
<i>Gilia millefoliata</i>	6
<i>Grindelia hirsutula</i> var. <i>maritima</i>	2
<i>Hesperervax sparsiflora</i> var. <i>breviflora</i>	1
<i>Lasthenia macrantha</i> var. <i>macrantha</i>	6
<i>Layia carnos*</i>	1
<i>Limnanthes douglasii</i> ssp. <i>sulphurea</i>	1
<i>Linanthus rosaceus</i>	11
<i>Lupinus tidestromii</i> *	3
<i>Microseris paludosa</i>	2
<i>Perideridia gairdneri</i> ssp. <i>gairdneri</i>	2
<i>Polygonum marinense</i>	13
<i>Ranunculus lobbii</i>	5
<i>Sidalcea calycosa</i> ssp. <i>rhizomata</i>	3
<i>Stellaria littoralis</i>	5
<i>Triphysaria floribunda</i>	5
Total	148

* Federally Endangered

Table 3. The approximate number of acres surveyed for each habitat type. Forest habitat includes Oak woodland, Douglas Fir, California Bay Laurel, and Pine Forest. Wetland habitat includes freshwater marsh, salt marsh, and riparian habitat.

Habitat Type	Approximate number of acres surveyed
Coastal dune	1,848
Coastal scrub	775
Forest	52
Grassland	1,588
Wetland	83
TOTAL	4,346

4.0 Conclusion

While this report signifies the completion of the 2001-2004 PORE Rare Plant Inventory, the effort to obtain accurate and complete information describing the abundance and distribution of rare plants

within the Seashore will be ongoing. As plant species are listed, park projects proposed, and new lands acquired, the need for rare plant survey work will continue.

Based on the success of the PORE Rare Plant Inventory effort, it is recommended that future survey work follow the methodology presented in this report. Future rare plant surveys should be documented using the PORE Rare Plant Inventory Field Sheet (Appendix 2) and mapped in GIS according to the protocol described in Appendix 3. The PORE Plant Ecologist should be consulted to obtain the most up to date rare plant survey protocol.

The following pages include maps and survey data collected during the 2001-2004 inventory. It is our intent that the data collected during this effort will be used to assist in rare plant management and monitoring activities in the future.

5.0 References

California Native Plant Society 2001. *Inventory of Rare and Endangered Plants of California (sixth edition)*. Rare Plant Scientific Advisory Committee, Davis P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA. pp. 2-4

Clark, R.A. and Fellers, G.M. 1987. *Rare Plants at Point Reyes National Seashore* Fremontia 15(1): pp. 13-16.

Self, D. 1982. *Preliminary Rare Plant Inventory and Management Plan* Unpublished report. Vegetation Division, Point Reyes National Seashore.

7.1 Appendix 1: Inventory Schedule

Example of PORE Rare Plant Inventory Schedule for the month of June

The plants below are organized by habitat type. Approximate elevation is included in brackets. Information was obtained from the “Jepson Manual of Higher Plants of California” (Hickman 1993) and “A California Flora” (Munz 1959).

A. Coastal dunes

***Abronia umbellata* ssp. *breviflora* - Pink sand-verbena**

Agrostis blasdalei [<100 m] - Blasdale's bent grass

Chorizanthe cuspidata var. *cuspidata* [< 250 m] - spineflower

***Chorizanthe cuspidata* var. *villosa* [< 250 m] - spineflower**

Gilia capitata ssp. *chamissonis* [< 60 m] - Dune gilia

Gilia millefoliata (stabilized) [< 10 m] - Dark-eyed gilia

Lasthenia macrantha ssp. *macrantha* [< 500 m] - Perennial goldfields

Layia carnosa [< 60 m] - Beach layia

Lupinus tidestromii [< 100 m] - Tidestrom's lupine

***Monardella undulata* [< 300 m] - Curly-leaved monardella**

Potential species

Erysimum franciscanum (sometimes) [< 500 m] - San Francisco wallflower

B. Grassland

Hemizonia congesta ssp. *leucocephala* (often in fallow fields) [< 200 m] - White hayfield tarplant

Lasthenia macrantha ssp. *macrantha* [< 500 m] - Perennial goldfields

***Linanthus rosaceus* - Rosy Linanthus**

***Perideridia gairdneri* var. *gairdneri* [< 350 m] - Gairdner's yampah**

Plagiobothrys diffusus (*Plagiobothrys reticulatus* var. *rossianorum*) [< 300 m] – popcorn flower

***Triphysaria floribunda* [< 100 m] - San Francisco owl's clover**

1. Sandy soils

***Chorizanthe valida* [< 300 m] - Sonoma spineflower**

Hesperexax sparsiflora var. *brevifolia* [< 200 m] - Short-leaved exax

Horkelia marinensis [15-350 m] - Point Reyes horkelia

Linanthus grandiflorus [< 1200 m] - Large-flowered linanthus

2. Moist places

Microseris paludosa [< 300 m] - Marsh microseris

C. Coastal Prairie

Agrostis blasdalei [<100 m] - Blasdale's bent grass

Arabis blepharophylla [< 500 m] - Coast rock cress

Blennosperma nanum var. *robustum* - Point Reyes blennosperma

***Lilium maritimum* [175 - 1300 m] - Coast lily**

***Perideridia gairdneri* var. *gairdneri* (coastal flats) [< 350 m] - Gairdner's yampah**

D. Coastal Scrub

Agrostis blasdalei [<100 m] - Blasdale's bent grass

Arabis blepharophylla [< 500 m] - Coast rock cress

Lilium maritimum [175 - 1300 m] - Coast lily

Monardella undulata (sandy areas in sagebrush scrub) [< 300 m] - Curly-leaved monardella

E. Coastal bluffs

Agrostis blasdalei [<100 m] - Blasdale's bent grass

Arabis blepharophylla [<500 m] - Coast rock cress

Ceanothus gloriosus var. gloriosus [<500 m] - Point Reyes ceanothus

Cirsium andrewsii [<100 m] - - Franciscan thistle

Hesperervax sparsiflora var. brevifolia (sandy) [<200 m] - Short-leaved evax

Lilium maritimum [< 175 - 1300 m] - Coast lily

Stellaria littoralis [< 40 m] - Beach starwort

F. Wetlands / Wet sites

1. Marshes

Lilium maritimum [175 - 1300 m] - Coast lily

Stellaria littoralis [< 40 m] - Beach starwort

Freshwater Marsh

Alopecurus aequalis var. sonomensis - Sonoma alopecurus

Campanula californica (marshy coastal areas) [< 10 m] - Swamp harebell

Sidalcea calycosa ssp. rhizomata [< 30 m] - Point Reyes checkerbloom

Coastal Salt Marshes

Cordylanthus maritimus ssp. palustris [< 10 m] - Point Reyes bird's beak

Polygonum marinense (at tideline) [< 10 m] - Marin knotweed

Potential species

Castilleja ambigua ssp. humboldtiensis [~ 0 m] - Humboldt Bay owls-clover

2. Riparian

Pleuropogon refractus (shady banks) [< 1600 m] - Nodding semaphore grass

3. Wet meadows

Pleuropogon refractus [< 1600 m] - Nodding semaphore grass

4. Seeps

Cirsium andrewsii [< 100 m] - Franciscan thistle

5. Intertidal flats

Limosella subulata [< 10 m] - Delta mudwort

G. Forests

1. Coniferous

Elymus californicus [< 300 m] - California bottlebrush grass

Lilium maritimum (in gaps) [< 175 - 1300 m] - Coast lily

Perideridia gairdneri var. gairdneri [< 350 m] - Gairdner's yampah

2. Moist sites

Plagiobothrys diffusus (Plagiobothrys reticulatus var rossianorum) [< 300 m]

Pleuropogon refractus [< 1600 m] – Nodding semaphore grass

7.2 Appendix 2: Rare Plant Inventory Sheet

Inventory ID:

*** Attach map with survey area indicated**

Reporter:

Date(s) of Survey:

Location (directions, point of access, etc.):

Target plant(s):

Habitat description (plant communities, etc.) :

*** be sure to list potential T&E plants that may occur in area searched**

T&E plants found (indicate if they are known populations):

GPS coordinates

Comments (visible disturbances, *suggestions for future surveys*, etc.):

7.3 Appendix 3: Rare Plant GIS Metadata

Location of dataset: S:\\GIS\\vector1\\veg\\rare plants\\covers\\PORE_rareplant_inventory

Type of dataset: GIS shapefile, polygon

Brief summary of dataset: The data document areas surveyed during the Point Reyes Rare Plant Inventory conducted between 2001-2004. Each polygon contains the dominant habitat type, survey date, and a unique identifier that links the dataset to the Point Reyes Rare Plant database. Polygons were created by heads-up digitizing the survey area drawn onto the topographic map at the time of the survey.

Creation of dataset: 2001-2004

Dataset projection: UTM NAD 83

How dataset was created: Inventory areas were identified based on their potential to support rare plant species. Surveys were conducted by walking through the area and by focusing searches on areas that contained suitable habitat for target species. At the end of each rare plant survey a polygon was hand drawn onto a topographic map to mark the area covered by the search. In some cases, to increase accuracy, UTM points were taken using a GPS unit to note the beginning and end points of a survey area. The hand drawn polygons were then digitized in ArcView using heads-up digitizing. It is important to note that these polygons provide an approximation of the area surveyed and should not be interpreted as providing precise spatial information.

In an effort to provide more detailed site information, some polygons have been divided into sub-polygons to represent different vegetation community types encountered during the survey. These divisions were made based on field notations included on the hand drawn map or by overlaying the Point Reyes National Seashore vegetation map onto the inventory polygon. Long, narrow polygons that represent survey routes along salt marsh edges, roads, and trails were created by digitizing a line or bringing in the section of trail as a line, then buffering the line and converting the line to a polygon. Polygons (and sub-polygons) can be linked to the survey data included in the Point Reyes National Seashore Rare Plant Database by the unique polygon identifier field 'inventory id'. The dataset has been checked for typos (attribute table) and the habitat types/vegetation communities used to make the sub-polygon divisions, verified.

Attributes (fields) included the dataset:

1. **inv_id** = Inventory ID: unique code that links the polygon to the Access database record, which contains site information recorded on the day of the survey. The code is 7 characters long, the first 4 characters are the park code (PORE, GOGA, etc.) and the last 3 are sequential numbers assigned at the time of data entry (example inv_id: PORE001). This is a unique code and will not be repeated. All data entered by PORE staff received inv_id codes

beginning in PORE regardless of where the inventory took place (in PORE or in GOGA). This eliminates duplicate inv_id codes that may occur when PORE staff enter data gathered on GOGA lands and/or when GOGA staff enter data gathered on PORE lands (all inv_id codes entered by GOGA staff will have the first 4 characters as GOGA).

2. **habitat:** 6-letter code that describes the dominant vegetation community type in the polygon or sub-polygon. Sub-polygons are delineated by vegetation type and were created when the survey crossed through different vegetation communities. The 6-letter habitat codes, used to name the dominant vegetation community in the polygon or sub-polygon, were derived from the vegetation series included in the park vegetation map. They include the following:

COSCRB = coastal scrub
GRASLD = grassland
RIPARN = riparian
PINFOR = pine forest
DFRFOR = Douglas fir forest
SAGPND = sag pond
WETLND = wetland
CODUNE = coastal dune
STDUNE = old stabilized dune
BAYFOR = California bay forest
OAKFOR = Oak Forest
EUCFOR = eucalyptus forest
SALTMA = salt marsh
URBNDI = urban disturbance

3. **habseq** = habitat sequence: sequential numbers that serve as a tally of the habitat types encountered during each inventory event. For example, if during one survey event four separate vegetation types are encountered, four separate sub-polygons (one per habitat type) would be included under a single inv_id and each sub-polygon would receive a number 1 through 4.
4. **cdate1** = creation date #1: the date of the initial survey
5. **cdate2** = creation date #2: date survey was completed if it was not finished on the date of initial survey (cdate1).

7.4 Appendix 4: Rare Plant Survey Field Form

Mail To:
Natural Diversity Data Base
California Dept. of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

For office use only

Source Code _____ Quad Code _____
Elm Code _____ Occ # _____
Copy to _____ Map Index # _____

Date of field work: ____ - ____ - ____
mo day year

Scientific Name (no codes): _____

Type of survey (circle one): Initial Survey Monitoring

Known PORE Population? Yes No

Population #: _____

Species Found? [] [] _____
yes no if not, why?

Is this an existing NDDDB occurrence? [] [] []
Yes, Occ. #
no unk

Reporter:

Address:

Phone:

Other knowledgeable individuals (name/address/phone):

Plant Information:

Total # Individuals: _____

How did you derive total #? (circle one) Censusing Sampling Ocular Estimate

Population Area (exact number if possible): ____ < 1 m² ____ 1-5 m² ____ 5-10 m² ____ 10-100 m² ____ 100m²-1ha ____ 1 ha+ (=2 ½ ac)

How did you obtain area? (circle one) GPS Measured Estimated Area

Phenology: _____
% vegetative % flowering % fruiting

Comments:

Location: (Please also attach or draw map on page 4.)

County: _____ Landowner/Mgr: _____

Quad Name: _____ Elevation: _____ Datum _____

T _____ R _____ ¼ of _____ ¼ Sec _____

GPS unit: _____ GPS accuracy: _____ Mapped (check one) _____ as polygon in GIS _____ on hand drawn map

UTM Coordinates:		Point Represents:		
UTME	UTMN	Center of Polygon	Distinct Cluster <i>of Plants</i>	Individual Plants <i>(indicate #)</i>
<hr/>				

Habitat Description:

Aspect (check) _____ N _____ E _____ S _____ W _____ Flat _____ Multiple directions

Slope: (check one) _____ 0°- 20 _____ 20°- 45 _____ 45° + _____ Vertical

Other rare ssp. present:

Habitat Description (Plant communities, substrates/soils, etc):

Site Information:

Current /surrounding land use:

Visible disturbances, possible threats:

Overall site quality: [] Excellent [] Good [] Fair [] Poor

Degree of cattle impacts: [] High [] Medium [] Low [] None

Determination: (Check one or more, fill in the blanks)

_____ Keyed in a site reference: _____

_____ Compared with specimen housed at: _____

_____ Compared with photo/drawing in: _____

_____ By another person (name): _____

_____ Other: _____

Photographs: (Check one or more)

	Digital	Slide	Print
Plant	_____	_____	_____
Habitat	_____	_____	_____
Diagnostic Feature	_____	_____	_____
Other	_____	_____	_____

May we obtain duplicates at our expense? [] yes [] no

Plant Composition: (use percent cover or cover class)

Dominant Plant Species

<i>Species</i>	Percent Cover	Cover Class¹

Non-Native plant species

<i>Species</i>	Percent Cover	Cover Class¹

1. cover classes: (1) <1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%

Map Sketch: (include North arrow, distinctive landmarks, estimated distances, and compass bearings)

8.0 Species Index

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